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Oral Mucosal Response to Prosthesis

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INTRODUCTION: -

Any prosthesis which has been designed and fabricated will have its impact on the oral mucosa. The aim of any prosthesis is conservation and maintenance of the oral tissues. There are several occasions when the prosthesis itself becomes a causative agent for some pathologies which can be either iatrogenic or,thay may arise due to inadequate maintenance by the patient, or due to some inherent properties of the material used in prosthesis. The various factors which evoke oral mucosal response to the prosthesis include surface properties and physical properties of a prosthesis leading to the plaque accumulation, chemical properties of prosthesis leading to oral allergic reactions and changes in the oral environmental conditions such as alteration of the microflora.[1]

Sequale Caused by using prosthesis:- It includes two types i.e. direct and indirect sequale.

Direct Sequale:-
Denture stomatitis
Denture irritation hyperplasia
Traumatic Ulcers
Angular Cheilitis
Flabby ridge
Gagging
Residual ridge reduction
Burning Mouth Syndrome
Caries and periodontal disease caused by overdenture abutments

Indirect Sequale:-
Atrophy of Masticatory muscles
Nutritional deficiencies
Oral Allergic reactions [2]

Denture Stomatitis:- Denture stomatitis is one of the oral mucosal condition seen in denture wearers . In this condition, inflammation and erythema of the oral mucosal tissues coming in contact with the maxillary denture is seen. It is commonly seen on palate. It is classified as Type I where, the inflammation of the palatal mucosa is localised and is there because of trauma. In Types II denture stomatitis, there is a diffuse involvement of the denture-bearing mucosa is diffusely involved. Type III is similar to Type II, but the only difference here is that a granular type of involvement is noted. In advanced stage of this condition type III denture stomatitis is known by the names of inflammatory papillary hyperplasia or granular denture stomatitis (Newton, 1962). Management involves discontinuation of the use of existing denture and application of a topical antifungal agent such as clotrimazole. [3]

Denture Irritation Hyperplasia: - This condition is caused due to chronic trauma especially from ill-fitting dentures prosthesis or sometimes because of the parafunctional habits. Oral mucosal lesions are seen as solitary or multiple hyperplastic tissue folds or as folds of hyperplastic connective tissue which is covered with stratified squamous ephitelium in the alveolar vestibule. Sometimes inflamed areas and ulcerated spots are noted just beneath these fissures. The lesions can be seen in different varying sizes ranging from a localized hyperplasia measuring less than 1 cm to big lesions involving most of area of the vestibule. In early stages, it can be treated just by discontinuing the prosthesis and putting the subject on topical or systemic antifungal therapy. In advanced stages, the area has to be surgically excised before the fabrication of new prosthesis.[4]

Traumatic Ulcers: - The ulcers which are noted in oral mucosal tissues because of trauma are called as traumatic ulcers. Its a common finding in subjects who are denture wearers. These lesions are commonly seen on buccal mucosa and lateral border of tongue. The traumatic ulcers which are noted on the mucobuccal folds and gingiva can be attributed to the various irritant factors in a prosthetic appliance such as its sharp edge. Traumatic ulcers could be of localised shallow or deep diffuse type having ill defined borders, which can be seen on the epithelium and can be associated with mild, moderate to severe degree of keratosis . A majority of traumatic ulcers show healing spontaneously and uneventfully without causing complications or going into advanced stage in a brief time period. But in certain cases, the chronic persistent traumatic factors, like presence of sharp surfaces of removable prosthesis, can lead to the formation of chronic traumatic ulcers. [5]

Angular cheilitis: - Angular cheilitis is an oral mucosal lesion seen at the corners of the mouth starting from the muco-cutaneous junction from

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inside and extending to the skin outside. This condition is begins with the erythema, followed by moist maceration, ulceration, and crusting at the commissures of the lips. Angular cheilitis has multiple etiologies which includes both systemic and local causes. Local factors for angular cheilitis can be categorized as anatomical, mechanical, chemical, and infection induced causes. The systemic factors can be either due to nutritional deficiencies, certain systemic pathologies, or it can be due to some drug-related adverse effects. The most common etiology for angular cheilitis which has been noted in several cases is either reduced or decreased vertical dimension of the jaws leading to the which overclosure of mouth. As the vertical dimension of face gets reduced, it cause pooling and stasis of saliva at the commissures of the mouth leading to the maceration of perioral skin and oral mucosa. [6]

Flabby Ridge: - Flabby tissue is an oral mucosal condition which has been reported commonly in subjects who have been using dentures for a long period of time. This condition arises because of the hyperplasia in the tissues of oral mucosa which causes the mucosa to grow over the alveolar bone. These hypermobile tissue growths in the alveolar ridges of maxillary and mandibular dental arches cause difficulty in wearing denture prosthesis by the patient. The ill fitting prosthesis (either partial or complete denture) put a constant pressure and traumatises the tissues beneath it leading to the formation of alveolar ridges with flabby tissues. In such cases, the mucosa is extremely movable and is also loosely attached to underlining bony periosteum. This flabbiness is attributed histologically to the loose fibrous and dense collagenized connective tissue matrix. It is generally noted in anterior region of an edentulous oral cavity.[7]

Gagging:- The gag reflex can arise either from physiological or psychological causes. Physiological cause includes stimulation of soft palate and fauces by the denture surface. Psychological cause includes previous unpleasant experiences or sense of anxiety. Physiological gagging can be reduced by removing the plate portion of maxillary denture or by instructing the patient to simulate contact with their oral mucosa so that they get accustomed with the sensation. Psychological gagging is most difficult to treat since it is out of the dentist's control at times. In such cases adequate communication with the patient is required so as to reduce patient's anxiety regarding denture fitting and insertion.[8]

Residual Ridge Resorption: - Residual ridge resorption is a pathological condition seen in edentulous regions. The residual ridge resorption occurs at a faster rate during the first year after tooth loss, but the rate of resorption decreases slowly but keeps on progressing after that. The remodeling of bone is depends on the nature of force which has been exerted over it and is a resultant of various factors such as which misuse of the denture prosthesis like for example intensive denture wearing by the subject, occlusal disturbances, immediate denture treatment and by using an improperly fabricated denture. Studies by Campbell have shown that the subjects who had a history of wearing complete denture prosthesis had smaller edentulous ridges as compared those edentulous subjects who didn't underwent any prosthetic rehabilitation. Also, it has been observed that the patients with complete dentures present with a greater degree of mandibular ridge resorption as compared to the resorption of maxillary edentulous ridges. The prosthetic rehabilitation of the patients with severe degree of residual ridge resorption can be achieved by the help of pre prosthetic surgical procedures or sometimes, it can be done without surgical intervention also which includes a variety of modified impression techniques for the resorbed edentulous ridges as suggested by various authors including admixed, functional all green ,and cocktail technique. The advantage of using these is that, it is useful in recording the primary and secondary stress-bearing areas without causing any distortion of the residual ridge. In addition to this, such techniques are very useful in the prosthodontic treatment as they offer a number of advantages such as easy control over the technique and maximum coverage of the region, they can be rectified readily, and they can be employed for accurately determining the extent of the mucobuccal reflections. They can also be used for directing pressure against the stress-bearing regions, especially, the buccal shelf and the slopes of residual ridges in the mandible. In prosthodontics, the use of soft liners has been increased day by day as they are helpful in various clinical situations. The soft liner materials are useful in providing healing effect to the inflamed oral mucosa and it also aids in distributing the functional load in support areas of the denture prostheses along with improving the adaptation thus providing retention of denture prosthesis. The surgical options for residual ridge resorption includes the use of bone grafting, in which the deficient bone is replaced with autogenous graft or by using some substitute, mostly a biocompatible

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material which can be either artificial, synthetic, or any natural substitute . One more method which has been used for the regeneration of bone is istraction osteogenesis, which is generally done after corticotomy or an osteotomy and gradual distraction . [9]

Burning Mouth Syndrome:- Burning mouth syndrome is a condition which has been grouped under psychosomatic disorders. The exact etiology of burning mouth syndrome is still unclear. It can be associated with the multiple factors and sometimes it can be a reflection of some other disease, which can be there because of some local or systemic factors. Prosthodontic patients having burning mouth syndrome are the ones, who face a lot of difficulty in wearing dentures. Inadequate retention of the prosthesis and improper stability can cause abnormal activity of the lingual musculature so as to achieve denture retention. (Lamey and Lamb, 1990). It is believed that denture extensions and inadequate free way space cause an increase in stress over the denture bearing regions, thereby causing a burning sensation in mouth (Svensson and Kaaber, 1995). In these cases, it is important that patient should discontinue using the dentures. Also it has been observed that some subjects are allergic to certain dental materials used in the fabrication of prosthesis, which can cause burning sensation in oral cavity (Van Ulsen and Van Loon, 1988). [10]

Caries and Periodontal Disease Caused by Overdenture Abutments: -It has been found that the incidence of gingivitis over the abutment teeth is higher in patients using overdentures. Also, the studies have shown that greater amount of dental caries and periodontal diseases has been noted in patients with patients poor recall compliance.[11]

Atrophy of Masticatory Muscles: - Studies have shown that the balance of muscular activity in subjects wearing complete denture prosthesis is less than that found in subjects with natural dentition. This decreased activity of muscles in edentulous subjects can be attributed to the loss of periodontal fibres. There are some receptors present in periodontium which help in determining the amount of compression of the bone bases of the jaws. These receptors are known as proprioceptors. Once the subject becomes edentulous, this system of proprioception is also lost. Therefore, in such cases, the ability of absorbing the masticatory forces gets reduced to a greater extent as compared to those who are having natural dentition [12]

Nutritional Deficiencies:- In elder patients, nutritional deficiencies are seen commonly, which can be attributed to the reduced intake of food because of the decaresed chewing activity and sometimes due decreased perception of taste. But it has also been observed that certain subjects, despite having poor masticatory function, rarely show any nutritional deficiencies. The prosthodontic treatment should be instituted so as to improve the masticatory function. Apart from this, there are some other factors also, that affect nutrition which include general health, socioeconomic status and dietary habits and they should be taken into consideration. [13]

Oral Allergic Reactions:- Studies have shown that some of the dental materials like base metal alloys and methacrylates can cause intraoral allergic reactions. It has been observed that the most common sensitizer amongst all metals is nickel. The common oral findings of nickel allergy are burning sensation in mouth, gingival hyperplasia, parasthesia on the lateral borders of tongue. Methyl methacrylate may cause mucosal irritation. [14]

Peri implantitis:- Peri-implantitis is a location specific infectious disease that leads to an inflammatory response in the soft tissues, and it also leads to the bone loss around an osseointegrated implant in function. The etiology of perimplantitis is multifactorial and it further depends on the condition of tissue around the implant prosthesis, design of implant, amount of roughness, external morphology, and excessive mechanical load. Other etiological factors include diabetes mellitus, osteoporosis, smoking, long-term treatment with corticosteroids, radiotherapy, and chemotherapy. The microbes that are most commonly associated with peri implantitis include spirochetes and mobile forms of Gram-negative anaerobes like Prevotella intermedia, Porphyromonas gingivalis, Aggregatibacter actinomycetemcomitans, Bacterioides forsythus, Treponema denticola, Prevotella nigrescens, Peptostreptococcus micros, and Fusobacterium nucleatum. Clinical features of peri implantitis include vertical bone destruction associated with the formation of a peri-implant pocket; bleeding and suppuration on probing; possible swelling of the peri-implant tissues, and hyperplasia. Pain is an unusual feature, which, if present, is usually associated with an acute infection. Management of this condition includes local debridement, decontamination of implant surface,instituting anti

microbial therapy and surgical intervention by using bone grafts. In advanced cases, where there is severe bone loss and poor prognosis, explantation (removal of implant) is done [15].

CONCLUSION: - Oral mucosa is sensitive to any kind of foreign material. Generally mucosal reactions occur from the mechanical irritation, accumulation of plaque and sometimes due to allergic reactions. These factors produce profound changes in the oral environment causing adverse effect on the integrity of oral tissues. Patient should be motivated to practice proper maintenance of oral hygiene. Apart from this patient should be kept under observation and recalled timely for monitoring of prosthesis and oral health. Further studies should be carried out to explore more about the mucosal biomechanics which will aid in clinical diagnosis, management and treatment planning.

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